SHELTERBELTS IN HUNGARY

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Introduction

In the current EU energy and climate policy a greater utilization of renewable energy is targeted. This is also likely to increase the demand for biomass resources as well. A significant proportion of biomass comes from forests. Increase of forest areas can only be achieved through wooded areas outside the forests. In Hungary, the use of buffer strips has a long and successful history, so the extension of their application would be justified. This paper presents the evolution, main characteristics and recent associated research and development activities on the Hungarian shelterbelt system.

Material and methods

Forestation programs of Hungary between 1946-1990 appropriated wide range shelterbelt establishments on agricultural areas. The ownership structure of socialization based on production cooperatives and centralized governance, which made possible to (re)form supportive cooperation of agriculture and forestry. In 1960 the length of the „field protecting" forest-belts achieved 2,500 km, which included 1,000 km on the Small Plain. Subsequent sources of 1975 mention 8.8-9.8 thousand hectares of extant shelterbelts for "field and meadow" protection (Keresztesi 1991, and Bán et al. 2001). The plan was to reach 30-33 thousand ha of total green-belts by establishing 20 thousand hectares more of all windbreak-kinds until 1990.

The Institute of Silviculture and Forest Protection is to survey the existing shelterbelt systems, roadsides' and related linear afforestations on the area of Győr-Moson-Sopron county and Small Hungarian Plain. The analysis started on two territories: (i) with 17 ha belts on 12 km^2 area (Sopronhorpács, spacious network, forest soils) and (ii) with 13 ha on 10 km^2 land (Sarród, dense network, organic meadow soils). These were established in an old style, but perfect examples in good conditions to study.

Results

Nowadays approximately 11900 hectares shelterbelts can be found in Hungary from which privately owned: 77%, state-owned: 18.4%, community owned 3.9% and the infinitesimally (0.7%) in mixed owned.

As far as the tree structure, it is very different from the average tree structure of Hungarian forest. The most important tree species are in the shelterbelts black locust (*Robinia pseudoacacia* 50%), pedunculate (English) oak (*Quercus robur* 12%), Hungarian elm (*Fraxinus angustifolia* ssp. *pannonica* 5%), red ash (*Fraxinus pennsylvanica* 5%) and the others are under 4% (**Figure 1**).

In the Hungarian silviculture system four systems are distinguishable: clearcutting system, transition system, selection system and non-wood productive forest. In the case of transition system, the goal is to reach the selection system. The selection system is a method in which individuals of trees or groups of trees are harvested periodically and frequently. By the non-wood productive forest, the aim is to let natural processes taking their course. Felling is possible only for scientific, protection or regeneration purposes. The distribution of silviculture systems of Hungarian shelterbelts is shown in **Table 1**, and **Table 2** shows the minimum and maximum cutting age for important tree species grown in shelterbelts.

Table 1: The distribution of silviculture system of shelterbelts

Silviculture system	Area (hectares)
clearcutting	11757.93
selection system	4.27
non-wood production forest	67.4
transition system	9.84

Table 2: Some tree species and their minimum and maximum cutting ages when grown in shelterbelts

Tree species	Min. cutting age (year)	Max. cutting age (year)
European beech (*Fagus sylvatica*)	100	130
white polar (*Populus alba*)	18	no limited
grey aspen (Populous x canescens)	25	no limited
pedunculated oak (*Quercus robur*)	20	no limited

The cutting age in the shelterbelts is very different from the cutting age used in traditional forest management. The reason is that the first function of the shelterbelts is the protection of soil and/or agricultural land.

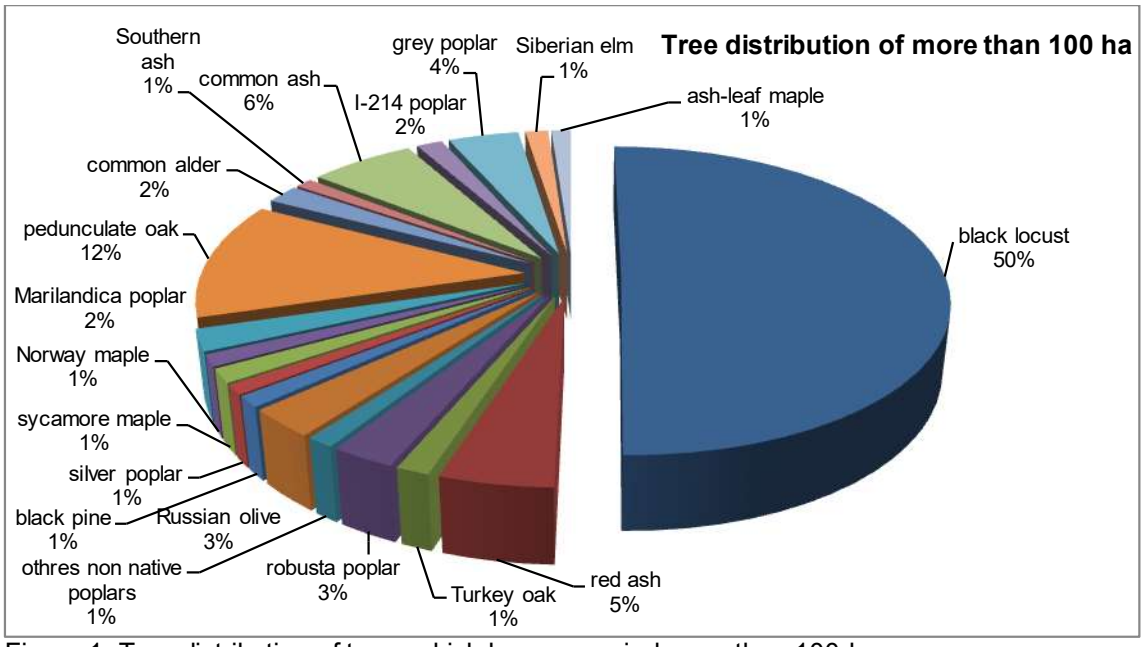

Figure 1: Tree distribution of trees which have occupied more than 100 ha

Since the structure and species composition of shelterbelts significantly different form that of production forests, natural regeneration in shelterbelts is in many cases almost impossible.

Discussion

The changes in the composition of the examined individual shelterbelts and the networks built up of them are originated in historical, land use and management events. The decades of socialization and the time passed since the privatization of rural lands are also stamped the development of linear forested establishments – such as windbreaks, shelterbelts, alleys or hedgerows – on rural areas. On our research sites the main functions are protection of the soil against deflation and protection of the road traffic against snow. Of course there are more objectives – nature conservation, wildlife habitats and economic relations –, but the common and most determinative objective is the sustainable structure which is the root of any usefulness. Among others, our goal is to compare the planting plan (1953) with the shelterbelt's structure in 2002 and 2015. The results - experimental data on long-term development of shelterbelts – will be adaptable input for structure design and in future rehabilitation of old forest belt systems.

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References:

Bán I et al. (2001) Information on the forest resources of Hungary. Hungarian State Forest Service, Budapest.

Frank N, Takács V (2012) Hó- és szélfogó erdősávok minősítése szélsebesség-csökkentő hatásuk alapján (Qualification of windbreaks and shelterbelts based on their effects on windspeed). Erdészettudományi Közlemények 2(1): 151-162.

Keresztesi B (1991) Forestry in Hungary 1920-1985. Akadémiai Kiadó, Budapest.

Takács V. (2004) A sopronhorpácsi mezővédő erdősávrendszer állapotfelmérése, a további hasznosítás lehetőségeinek vizsgálata. Erdészeti Lapok 139(4), 127-130.

Takács V, Frank N (2004) From forest livestock-keeping to multipurpose shelterbelts; Tradition, resources and potential in the relation of Hungarian forest management and agriculture. SSM International Congress, Lugo, Spain.

Takács V, Frank N (2005) Shelterbelts ensure the multifunctionaity on cultivated fields and diversity the landscape of Small Hungarian Plan. Multifunctionality of Landscapes. Analysis, Evaluation, and Decision Support, Justus-Liebig-University Giessen, Germany.

Takács V, Frank N (2008). The traditions, resources and potential of forest growing and multipurpose shelterbelts in Hungary. In Agroforestry in Europe (pp. 415-433). Springer Netherlands. ISBN 978-1-4020-8271-9